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ABSTRACT

Libraries are in a process of fundamental change brought about by radical changes in technology. This paper charts the changes that have taken place over the years and makes some assumptions as to how the future will look. Barriers to increased use of technology are analyzed and detailed, including: lack of uniformity in search systems; the difficulty of providing integrated access to resources; and problems with user authentication and authorization. Finally, the paper looks at what managers need to do to bring about these changes and reviews the relevant key issues, including strategic management, procurement, information technology, and staffing and staff development. (MES)

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The Management of Change in Electronic Libraries

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Abstract

Libraries are in a process of fundamental change brought about by radical changes in technology. This paper charts the changes, which have taken place over the years, and makes some assumptions as to how the future will look. The barriers to increased use of technology are analysed and detailed. Finally the paper looks at what managers need to do to bring about these changes and reviews the relevant key issues.

Paper

Introduction

The notion of digital libraries (or electronic libraries or virtual libraries as they are alternatively known) is in some senses long standing whilst in others is still in its infancy. Various commentators have predicted the arrival of digital libraries for some considerable time, but if we argue that traditional libraries comprise more than just data, if we define them as the sum of not only information sources, but also navigational tools, metadata systems such as catalogues, human support systems and a suitable environment within which information is delivered, then we can say that the digital library is still in its infancy. We are only a short way down the road but with no real idea as to where the road might eventually lead. In this paper I want to look briefly at how we

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have reached this point, and at some of the technical issues which are holding us back. More importantly, I also want to look at the medium term management problems relating to the delivery of digital libraries.

Critical to the current generation of information systems has been the steady progress in computerisation of all or most aspects of library functions, beginning in the early 70's with the development of computerised library catalogues, and moving through the development of circulation systems, to the development of the integrated library systems which appeared in many advanced libraries towards the end of the late 70's and early 80's. These integrated systems use a single, software architecture to manage the core processes of libraries including cataloguing, circulation, acquisitions, and financial control and, with varying degrees, other associated but perhaps less critical functions such as inter-library loan systems and management information. One of the biggest strides over this period was the development of the OPAC which revolutionised catalogue searching and first brought about the notion that libraries could be somehow be distributed and that catalogues did not necessarily represent just the stock held within that particular building.

ILS have continued to develop a mixture of highly sophisticated functions but alongside these has been the parallel emergence of other systems concerned with the delivery of information to the users. Critical has been the development of online information systems delivered initially through stand-alone CD-ROM's, then through networked CD-ROM's and now remote servers. More recently many of these have, in turn, been re-emerging as web compliant databases providing even an average library with the opportunity to search enormous collections of data. As consequence, the ILS has become somewhat less central, particularly if it has been unable to embrace these newer developments.

Perhaps the most recent and significant challenge to the supremacy of the ILS has been the development of the web and web-based resources and access tools. Libraries have had to encompass these emerging services and sometimes embrace them within a traditional library framework. This need - to be able to deal with conventional books and journals on one hand and electronic resources on the other - has given rise to what has become known as the hybrid library[1], the notion being that it must at one and the same time deal with both the plurality of e-resources, often with different interfaces and search engines, with true internet resources through gateway services i.e. portals, and yet in parallel deal with traditional library books and their circulation. The scale of this challenge is extraordinary. Developed libraries can quote a whole series of discreet services built up over the recent past, which somehow need to be integrated. Chris Rusbridge for example, the Director of the UK electronic libraries program, notes[1] over 18 in one library system, and my own library could quote probably as many and include: the catalogue, several CD/ROM systems (each of which have a different proprietary interface), web based services, internet search engines, gateway services, portals, intranet information retrieval systems, etc. There is a distinct lack of uniformity in the approach so that users are faced with learning a multiplicity of search systems to undertake even a small scale literature search, particularly if they are working in cross disciplinary areas.

Thus there are a number of technical barriers, which stand in the way of the development of the true digital library, and it is to these that I shall now turn. The first is the issue of integration. Digital libraries are increasingly dealing with a distributed environment where users require seamless access to both distributed and heterogeneous resources. What is usually advocated, is a single

point of access to a totality of digital library collections, which is adequately scoped to meet the needs of that individual. Such a system would retrieve a relevant set of references together with suitable annotations, be adequately deduplicated and effectively ranked. Much technical effort has gone towards that end and yet you might reflect that it is an unachievable idea. Research suggests that given the choice, users are as likely to look for discreet subsets, for whatever reason, rather than a single integrated source. Some levels of integration have been achieved, particularly through the web itself, although that only offers integration at a rather shallow level. Z39.50 will also permit users to search distributed resources, but this is not widely adopted outside the library sector. A redefinition of Z39.50 in the context of RDF/XML is proposed but success is not guaranteed here either. Meanwhile, we have witnessed the emergence of web portals and harvesting technologies, driven by knowledge management developments, which are capable of harvesting and collating resources into high quality and highly personalised subsets.

A second technical issue, which might be incorrectly considered trivial, is that we do not actually know who the user is. In the electronic domain this is not a simple question. We need assurances as to the fact that users are who they say they are. They must be suitably validated by some other organisation and we must have systems in place, which permit them to do only what we would wish. The first level of that is authentication which is the process of identifying users on the network and is usually brought about by a combination of username/password approaches or IP domain search and restriction. More sophisticated accreditation systems are coming through, but these are currently relatively little used in these areas, and are more common in e-commerce applications. Once we have identified who someone is, there is a secondary process of authorisation, which essentially says what he or she can do once they have access. This is particularly important for the managers of licensed resources and is even more critical in the context of the provision of primary and secondary sources and multimedia. The final challenge is the need for highly effective navigational tools to create seamless logical and understandable routes through the digital library.

Will libraries in the future disappear entirely? Rusbridge[2] argues that libraries can be defined in three ways: as concept, as organisation, as physical space. Though the concept of a library as a collection of information sources defined by certain boundaries will sustain, the boundary definitions will be more complex, deriving as much from consortial deals, usage issues and historical commitments to collections within a building. The digital library will be a more fluent concept capable of continuous change and modification and even defined by the end user as much as by the librarian intermediary.

At an organisational level, licensed resources will still need to be selected and evaluated, contracts negotiated and all placed within context of a suitable navigational system such as a web portal or a learning environment. Moreover even the virtual library must have a context within which it operates which might be the organised corporate context, but might also be the more local context of a research group or a university course or even at an individual level. Bookmarks recorded in a web browser or through personalised environments[3] are in effect personalised digital libraries.

Finally libraries as a physical environment seem on the surface the least likely to exist in a digital future. Access to web services can be got from most places with adequate connectivity which, with the increasing impact of mobile communications, means literally anywhere. Digital libraries will be free of the

constraints of delivering audio and graphics and universally portable as individuals become able to access and maintain their own institutional view of the library. The counter arguments to this view are the rather bleak future which centres on the loneliness and isolation that it can engender. The argument goes that we still need spaces where users can come together, even if they are working independently, and which are conducive to long periods of screen use, are ergonomically designed, and have in place support systems and navigational help together with an associated output devices such as colour printers or high definition screens. These centres are already merging as internet cafes, resources centres, learning hubs and so on. Moreover, such centres are likely to coexist with more traditional provision permitting ease of use.

Management of Change

Managerial and change issues encompassing the move to digital libraries are substantial and involve both human and resource factors. Moreover, the changes are often difficult to predict, dependant as they are on the ever-changing nature of technology.

At the economic level, libraries in developed services are already aware of the problems, which derive from the need to maintain dual subscriptions to both electronic and traditional materials during this transitional period, which could last for some years. Users are often disinclined to make radical changes in their use of materials and resent electronic formats being imposed upon them; they also frequently require connectivity, machinery or skills to make best use of what is available. Moreover spiralling journal prices add to the extra cost burden so that any potential savings in labour the library might feel would be brought about by electronic delivery, are often difficult to realise.

Perhaps more positively has been the growth of consortial purchasing of bundled services which, as a consequence, should show some economy in budgets and also serve to democratise resource provision, especially for smaller institutions which can 'piggy back' on larger organisations resource requirements. However, we should be wary of purchasing policies which create redundancy in provision and that such bundled purchasing potentially enables access to large amounts of material which might be little needed. An alternative is that of part-work selling, though at this point there seems to be little enthusiasm at library levels for end user charging or even for libraries to mediate in some similar arrangement. My suspicion is that this will come about in time, at least as a way of providing backup to core materials will enable the shift to happen more quickly.

A third strand is a growth of web publishing at the individual or corporate university level. Such activities may well precede traditional publishing. There is a steady growth of quality material now available on the web and accessible through the main search engines or through the more specialised web portals. Such personalised publishing will, in time, undermine traditionally publishing structures and will most certainly bring down overall pricing mechanisms over a period of time. For the library managers, the economics of digital library delivery are complex and changing but I would argue, the longer term signals are largely healthy in that we may at least seen the end of the spiralling costs of scholarly publishing from a mixture of those resources to which access has been negotiated and those which have been defined as having a requisite level of quality to those which have been self defined by the author including adding in the right descriptions so as to be retrieved through agent or similar technologies.

What then does the library manager need to do to ensure this shift to electronic delivery is as smooth as possible. What are the factors that need to be addressed?

I've categorised my own views under four distinct headings which derive from the analysis above. These are strategic change, procurement, IT, staffing and staff development.

Strategic management

To bring about a transition to new forms of library suggest that the library manager should provide clear and articulate vision as to what the service might look like, how it might perform and how it will be evaluated at some future time. It should not be too far fetched or so far beyond the imagination of staff as to preclude its acceptance, but it will be a matter of driving the service forward and ensuring that those charged with delivering the change feel some ownership of it. As importantly it will need to encompass the views of the users, many of whom may with to retain a traditional perspective on library delivery. Strategic plans will need to be sold on to the client base and achieve at least a respectable level of acceptance particularly from the executive, though in the end it may not gain total acceptance of everybody within the organisation. A good example of this might be our own drive towards the delivery of electronic rather than print journals. This has been formulated at the centre but we are having to undertake a program of effectively selling the notion to various schools within the university, to ensure some acceptance of e journals when they duly arrive. This has, to date, proved rather successful and we are now in the position where we are delivering more e- journals than we are traditional journals. The library manager, involved in strategic management must be very focused and the vision should be reinforced to the staff at all levels.

Procurement

The economics of electronic services are described above and in some contexts could well imply a difficult period of increased expenditure so as to achieve medium term economies. One route through that process is to seek collaborative purchasing with like minded libraries. Such consortial arrangements have become common globally and are not only a way of reducing the expending cost of material provision but can also absorb the load of licence agreements and the legalities surrounding different approaches resulting from electronic libraries. To be effective consortia probably need libraries with similar purchasing power or similar clientele so the charges levied on constituent members begins to be equitable. Consortial approaches can also be used to develop digital content, underwrite the cost of digitisation of material of retrospective conversion and so on and are likely to become more a feature of library services as they become more distributed.

Information Technology

IT can be problematic from a number of points of view. It may for example be without the librarians control in which case one is left with the need to reach sensible agreements with those supporting and delivering IT serves to ensure that the services are reliable and available. Even if there is local control of library related IT, institutional control may not rest with the librarian. In some countries this has become more the case but is still not widespread. Again if IT is without the control of the librarian this can be a factor which hinders overall uptake web based services. There is a need to try to ensure at least a commonality of approach and that basic software such as plugins, etc are available institution wide.

Staffing and Staff Development

Perhaps more critical than any of these is to ensure that staff structures are in place which will meet the new challenges of electronic delivery. This will imply analysing every function within the service and asking the question, is it appropriate to continue to work in this way or there alternatives that will help us achieve the strategic goal of delivery mechanisms? The nature of the core business of a library will change and functions such as cataloguing, which it could be argued has been the absolute foundation of libraries for the past hundred or so, might well be achieved by subsidiary agencies such as National Cataloguing centres or global utilities. Technical services departments may have to find alternatives roles which could imply cataloguing internet resources, though even this begs the question would it be better done co-operatively. It would be foolish to achieve economy in traditional cataloguing methods merely to replace it with another format and the development of the portals render this unnecessary. Many library staff will need to be re-skilled, both to ensure their knowledge and increase awareness of the accent in user support.

In summary we are going through a period of rapid change in the delivery of library services and need to re-think and constantly re-invent what we are. The library of the future will be more concerned with adding value to information resources and providing support and guidance as it will with acting as custodians of print material.

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